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In the Claims

Current Status of Claims

1.**(canceled)**
2.**(canceled)**
3.**(canceled)**
4.**(canceled)**
5.**(canceled)**
6.**(canceled)**
7.**(canceled)**
8.**(canceled)**
9.**(canceled)**

10.**(currently amended)** A composition comprising a polymerase including a ~~molecular~~ polymerase tag covalently bonded to a site on the polymerase and nucleotide or analog types for the polymerase, where at least one nucleotide or analog type includes a ~~molecular~~ nucleotide tag bonded to a part of the nucleotide that is released due to action of the polymerase as the nucleotide is being incorporated ~~upon nucleotide incorporation~~, where at least one of the tags has a fluorescence property that undergoes a change before, during and/or after each of a sequence of nucleotide incorporations due to an interaction between the polymerase and the nucleotide and where the polymerase lacks the ability to remove a previously incorporated nucleotide.

11.**(canceled)**
12.**(canceled)**
13.**(canceled)**
14.**(canceled)**
15.**(canceled)**

16.**(currently amended)** The composition of claim 10, wherein each type of the nucleotide or analog types comprises a deoxynucleotide triphosphate (dNTP) or analog and the nucleotide tag is covalently bonded either directly or through a linker to the ~~pyrophosphate moiety~~ part of the dNTP or analog that is released due to action of the polymerase during nucleotide incorporation ~~of its dNTP~~.

17.**(previously presented)** The composition of claim 10, wherein the fluorescence property comprises a duration, an intensity and/or frequency of emitted fluorescent light.

18.**(previously presented)** The composition of claim 10, wherein the polymerase tag comprises

a fluorescent tag and wherein the fluorescence property is fluorescence resonance energy transfer (FRET), where either the nucleotide tag or the polymerase tag comprises a donor and the other tag comprises an acceptor and where FRET occurs when the two tags are in close proximity.

19.**(currently amended)** The composition of claim 108, wherein the polymerase comprises *Taq* DNA polymerase I and the site is or the sites are selected from the group consisting of 513-518, 643, 647, 649 and 653-661 of ~~SEQ. ID No. 11~~ *Taq* DNA polymerase I.

20.**(canceled)**
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48.**(canceled)**
49.**(canceled)**

50.**(currently amended)** A composition comprising a polymerase including a ~~molecular~~ polymerase tag covalently bonded to a site on the polymerase and deoxynucleotide triphosphate

(dNTP) or analog types for the polymerase, where at least one dNTP types includes a ~~molecular~~ nucleotide tag covalently bonded directly or through a linker to a part of the dNTP ~~the~~ that is release upon dNTP incorporation due to action of the polymerase, where at least one of the tags has a fluorescence property that undergoes a change before, during and/or after each of a sequence of dNTP incorporations due to an interaction between the polymerase and the dNTP.

51.**(currently amended)** The composition of claim 50, wherein the polymerase is a reverse transcriptase.

52.**(currently amended)** The composition of claim 50, wherein the polymerase is selected from the group consisting of *Taq* DNA polymerase I, T7 DNA polymerase, ~~Sequenase~~ SEQUENASE®, and the Klenow fragment from *E. coli* DNA polymerase I.

53.**(previously presented)** The composition of claim 51, wherein the reverse transcriptase comprises HIV-1 reverse transcriptase.

54.**(previously presented)** The composition of claim 50, wherein the fluorescence property comprises a duration, an intensity and/or frequency of emitted fluorescent light.

55.**(currently amended)** The composition of claim 50, wherein the polymerase tag comprises a fluorescent tag and wherein the fluorescence property is fluorescence resonance energy transfer (FRET), where ~~either the nucleotide tag or~~ the polymerase tag comprises a donor and the ~~other~~ nucleotide tags comprises ~~an~~ acceptors and where FRET occurs when the two tags are in close proximity.

56.**(currently amended)** The composition of claim 109, wherein the polymerase comprises *Taq* DNA polymerase I and the site is or the sites are selected from the group consisting of 513-518, 643, 647, 649 and 653-661 of ~~SEQ. ID No. 11~~ *Taq* DNA polymerase I.

57.**(canceled)**
58.**(canceled)**
59.**(canceled)**

60.(**canceled**)
61.(**canceled**)
62.(**canceled**)
63.(**canceled**)

64.(**currently amended**) A composition comprising a polymerase including a ~~molecular~~ polymerase tag covalently bonded to a site on the polymerase and a deoxynucleotide triphosphate (dNTP) or analog types for the polymerase, where at least one dNTP type includes a ~~molecular~~ dNTP tag covalently bonded directly or through a linker to the γ phosphate group of the dNTP or analog, where at least one of the tags has a fluorescence property that undergoes a change before, during and/or after each of a sequence of dNTP incorporations due to an interaction between the polymerase and the dNTP.

65.(**previously presented**) The composition of claim 64, wherein the polymerase comprises a reverse transcriptase.

66.(**currently amended**) The composition of claim 64, wherein the polymerase is selected from the group consisting of *Taq* DNA polymerase I, T7 DNA polymerase, ~~Sequenase~~ SEQUENASE®, and the Klenow fragment from *E. coli* DNA polymerase I.

67.(**previously presented**) The composition of claim 65, wherein the reverse transcriptase comprises HIV-1 reverse transcriptase.

68.(**previously presented**) The composition of claim 64, wherein the fluorescence property comprises a duration, an intensity and/or frequency of emitted fluorescent light.

69.(**previously presented**) The composition of claim 64, wherein the polymerase tag comprises a fluorescent tag and wherein the fluorescence property is fluorescence resonance energy transfer (FRET), where either the nucleotide tag or the polymerase tag comprises a donor and the other tag comprises an acceptor and where FRET occurs when the two tags are in close proximity.

70.(**currently amended**) The composition of claim 110, wherein the polymerase comprises *Taq*

DNA polymerase I and the site is or the sites are selected from the group consisting of 513-518, 643, 647, 649 and 653-661 of ~~SEQ. ID No. 11~~ *Taq* DNA polymerase I.

71.**(currently amended)** A composition comprising a polymerase including a ~~molecular~~ polymerase tag covalently bonded to a site on the polymerase and nucleotide or analog types for the polymerase, where at least one nucleotide or analog type includes a ~~molecular~~ nucleotide tag covalently bonded directly or through a linker to the terminal phosphate of the nucleotide, where at least one of the tags has a fluorescence property that undergoes a change before, during and/or after each of a sequence of nucleotide incorporations due to an interaction between the polymerase and the nucleotide.

72.**(previously presented)** The composition of claim 71, wherein the polymerase comprises a reverse transcriptase.

73.**(currently amended)** The composition of claim 71, wherein the polymerase is selected from the group consisting of *Taq* DNA polymerase I, T7 DNA polymerase, ~~Sequenase~~ SEQUENASE®, and the Klenow fragment from *E. coli* DNA polymerase I.

74.**(previously presented)** The composition of claim 72, wherein the reverse transcriptase comprises HIV-1 reverse transcriptase.

75.**(canceled)**

76.**(previously presented)** The composition of claim 71, wherein the fluorescence property comprises a duration, an intensity and/or frequency of emitted fluorescent light.

77.**(currently amended)** The composition of claim 71, wherein the polymerase tag comprises a fluorescent tag and wherein the fluorescence property is fluorescence resonance energy transfer (FRET), where ~~either the nucleotide tag or~~ the polymerase tag comprises a donor and the ~~other~~ nucleotide tags comprises ~~an~~ acceptors and where FRET occurs when the two tags are in close proximity.

78.(**currently amended**) The composition of claim 111, wherein the polymerase comprises *Taq* DNA polymerase I and the site is or sites are selected from the group consisting of 513-518, 643, 647, 649 and 653-661 of ~~SEQ. ID No. 1~~ *Taq* DNA polymerase I.

79.(**currently amended**) A composition comprising a polymerase including a ~~molecular~~ polymerase tag covalently bonded to a site on the polymerase lacking 3' to 5' exonuclease activity and nucleotide types for the polymerase, where at least one nucleotide or analog type includes a ~~molecular~~ nucleotide tag bonded to a part of the nucleotide that is released upon nucleotide incorporation due to action of the polymerase, where at least one of the tags has a fluorescence property that undergoes a change before, during and/or after each of a sequence of nucleotide incorporations due to an interaction between the polymerase tag and the nucleotide tag and where the site comprises a naturally occurring cysteine site or a cysteine replacement site in the polymerase selected so that the site is less than or equal to about 50Å from a tag on each incorporating nucleotide and is a site that is not involved in the function of the polymerase and the polymerase tag is covalently bonded to the naturally occurring cysteine site or the cysteine replacement site through its SH group.

80.(**previously presented**) The composition of claim 79, wherein the site is less than or equal to about 15Å from a tag on each incorporating nucleotide.

81.(**previously presented**) The composition of claim 79, wherein the site is less than or equal to about 10Å from a tag on each incorporating nucleotide.

82.(**previously presented**) The composition of claim 79, wherein the polymerase comprises a reverse transcriptase.

83.(**currently amended**) The composition of claim 79, wherein the polymerase is selected from the group consisting of *Taq* DNA polymerase I, T7 DNA polymerase, ~~Sequenase~~ SEQUENASE®, and the Klenow fragment from *E. coli* DNA polymerase I.

84.(**previously presented**) The composition of claim 82, wherein the reverse transcriptase

comprises HIV-1 reverse transcriptase.

85.**(previously presented)** The composition of claim 79, wherein each of the nucleotides comprises a deoxynucleotide triphosphate (dNTP) and the nucleotide tag is covalently bonded directly or through a linker to the pyrophosphate moiety of its dNTP.

86.**(previously presented)** The composition of claim 79, wherein the fluorescence property comprises a duration, an intensity and/or frequency of emitted fluorescent light.

87.**(currently amended)** The composition of claim 79, wherein the polymerase tag comprises a fluorescent tag and wherein the fluorescence property is fluorescence resonance energy transfer (FRET), where ~~either the nucleotide tag or~~ the polymerase tag comprises a donor and the ~~other~~ nucleotide tags comprises ~~an~~ acceptors and where FRET occurs when the two tags are in close proximity.

88.**(currently amended)** The composition of claim 83, wherein the polymerase comprises *Taq* DNA polymerase I and the site is selected from the group consisting of 513-518, 643, 647, 649 and 653-661 of ~~SEQ. ID No. 11~~ *Taq* DNA polymerase I.

89.**(currently amended)** A composition comprising a polymerase including a ~~molecular~~ polymerase tag covalently bonded to a site on the polymerase and a nucleotide including a molecular tag covalently bonded to a part of the nucleotide that is released upon nucleotide incorporation, where at least one of the tags has a fluorescence property that undergoes a change before, during and/or after each of a sequence of nucleotide incorporations due to an interaction between the polymerase tag and the nucleotide tag and where the site comprises a naturally occurring cysteine site or a cysteine replacement site in the polymerase selected so that the site is less than or equal to about 50Å from a tag on each incorporating nucleotide and the polymerase tag is covalently bonded to the naturally occurring cysteine site or the cysteine replacement site through its SH group.

90.**(previously presented)** The composition of claim 89, wherein the site is less than or equal to about 15Å from a tag on each incorporating nucleotide .

91.**(previously presented)** The composition of claim 89, wherein the site is less than or equal to about 10Å from a tag on each incorporating nucleotide .

92.**(previously presented)** The composition of claim 89, wherein the polymerase comprises a reverse transcriptase.

93.**(canceled)**

94.**(currently amended)** The composition of claim 89, wherein the polymerase is selected from the group consisting of *Taq* DNA polymerase I, T7 DNA polymerase, ~~Sequenase~~ SEQUENASE®, and the Klenow fragment from *E. coli* DNA polymerase I.

95.**(previously presented)** The composition of claim 92, wherein the reverse transcriptase comprises HIV-1 reverse transcriptase.

96.**(previously presented)** The composition of claim 89, wherein each of the nucleotides comprises a deoxynucleotide triphosphate (dNTP) and the nucleotide tag is covalently bonded directly or through a linker to the terminal phosphate group of its dNTP.

97.**(previously presented)** The composition of claim 89, wherein the fluorescence property comprises a duration, an intensity and/or frequency of emitted fluorescent light.

98.**(currently amended)** The composition of claim 97, wherein the polymerase tag comprises a fluorescent tag and wherein the fluorescence property is fluorescence resonance energy transfer (FRET), where ~~nucleotide tag or~~ the polymerase tag comprises a donor and the ~~other~~ nucleotide tags comprises ~~an~~ acceptors and where FRET occurs when the two tags are in close proximity.

99.**(currently amended)** The composition of claim 94, wherein the polymerase comprises *Taq* DNA polymerase I and the site is selected from the group consisting of 513-518, 643, 647, 649 and 653-661 of ~~SEQ. ID No. 11~~ *Taq* DNA polymerase I.

100.**(previously presented)** The composition of claim 50, wherein the polymerizing agent lacks the ability to remove a previously incorporated nucleotide.

101.**(canceled)**

102.**(previously presented)** The composition of claim 64, wherein the polymerase is free of or lacks the ability to remove a previously incorporated nucleotide.

103.**(previously presented)** The composition of claim 71, wherein the polymerase is free of or lacks the ability to remove a previously incorporated nucleotide.

104.**(previously presented)** The composition of claim 89, wherein the polymerase is free of or lacks the ability to remove a previously incorporated nucleotide.

105.**(previously presented)** The composition of claim 79, wherein the site is less than or equal to about 25Å from a tag on each incorporating nucleotide.

106.**(previously presented)** The composition of claim 89, wherein the site is less than or equal to about 25Å from a tag on each incorporating nucleotide.

107.**(canceled)**

108.**(previously presented)** The composition of claim 10, wherein the polymerase comprises a genetically engineered polymerase comprising a native polymerase including one cysteine residue replacement or a plurality of cysteine residue replacements at one site or a plurality of sites of the native polymerase, where the site or sites are not in contact with other proteins, where the site or sites do not alter the conformation or folding of the polymerase, where the site or sites are not involved in the functioning of the polymerase, and where the polymerase tag is bonded to the polymerase through a cysteine residue replacement or through a plurality of cysteine residue replacements.

109.**(previously presented)** The composition of claim 50, wherein the polymerase comprises a genetically engineered polymerase comprising a native polymerase including one cysteine residue replacement or a plurality of cysteine residue replacements at one site or a plurality of sites of the

native polymerase, where the site or sites are not in contact with other proteins, where the site or sites do not alter the conformation or folding of the polymerase, where the site or sites are not involved in the functioning of the polymerase, and where the polymerase tag is bonded to the polymerase through a cysteine residue replacement or through a plurality of cysteine residue replacements.

110.**(previously presented)** The composition of claim 64, wherein the polymerase comprises a genetically engineered polymerase comprising a native polymerase including one cysteine residue replacement or a plurality of cysteine residue replacements at one site or a plurality of sites of the native polymerase, where the site or sites are not in contact with other proteins, where the site or sites do not alter the conformation or folding of the polymerase, where the site or sites are not involved in the functioning of the polymerase, and where the polymerase tag is bonded to the polymerase through a cysteine residue replacement or through a plurality of cysteine residue replacements.

111.**(previously presented)** The composition of claim 71, wherein the polymerase comprises a genetically engineered polymerase comprising a native polymerase including one cysteine residue replacement or a plurality of cysteine residue replacements at one site or a plurality of sites of the native polymerase, where the site or sites are not in contact with other proteins, where the site or sites do not alter the conformation or folding of the polymerase, where the site or sites are not involved in the functioning of the polymerase, and where the polymerase tag is bonded to the polymerase through a cysteine residue replacement or through a plurality of cysteine residue replacements.